Georgia Space Grant Consortium
Georgia Institute of Technology
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http://www.gagsc.org
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PROGRAM DESCRIPTION

The National Space Grant College and Fellowship Program consists of 52 state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarships programs; interdisciplinary space-related research infrastructure, education, and public service programs; and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The **Georgia** Consortium is a Designated/Program Consortium funded at a level of **$575,000** for fiscal year 2011.

PROGRAM GOALS

The proposed programs were designed to reflect the geographic, gender and ethnic demographics of Georgia. The target goals for all programs will represent the demographics of the State of Georgia, as well as the enrollment of students in colleges and universities according to the National Center for Educational Statistics (Underrepresented Groups – 39.6%, Women – 57%).

Outcome 1

The programs being conducted by the GSGC consist of providing research opportunities that enhance students' research capabilities and prepare them for STEM employment. Programs are directed at the undergraduate and graduate level with a strong focus on underrepresented groups in their freshman and sophomore years.

Outcome 2

Hands on research, seminars, and professional development workshops capturing all STEM subjects will be conducted throughout the state. Greater emphasis is being placed on collaborations to reach a greater number of faculty and students in Georgia.

Outcome 3

Large scale events for informal science education organizations will continue to be conducted at our member institutions planetariums and science centers.

PROGRAM/PROJECT BENEFIT TO OUTCOME (1,2, OR 3)

Outcome 1

Georgia Space Grant Fellows

- The first 2 African American females to graduate with Ph.D.'s in Aerospace Engineering at Georgia Tech, Dr. Christianna Taylor and Dr. Joy Braithwaite were space grant fellows. A third African American female and space grant fellow, Dr. Ashley Johnson received her Ph.D. in Electrical Engineering.

  Dr. Christianna Taylor is an intern at Microcosm in Los Angeles, CA.
  Dr. Joy Braithwaite is employed at the Institute for Defense Analysis in D.C.
  Dr. Ashley Johnson is employed with Corning in New York.

Posters presented at the Georgia Academy of Sciences

- VECTOR MEASUREMENTS OF THE GEOMAGNETIC FIELD IN THE REGION OF WEST GEORGIA, Sara Strouss and Dr. Ben de Mayo,

- ELECTRICAL RESISTANCE OF MULTI-WALLED CARBON NANOTUBES AS A FUNCTION OF TEMPERATURE, Adriane M. Melnyczuk and Dr. Ben de Mayo

Patents

- Dr. Ben DeMayo received a patent for a device that can extract up to 85 percent of the bitumen from a sample of oil sands using only heat and centripetal force. This useful process has important applications in environmental cleanup from oil spills.
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Awards and Recognition

- Georgia Tech student and former Space Academy Intern, Andrew Punoose placed 2nd in the AIAA Team Space Design Competition. Space Grant Fellows Adam Cortese, Robert Scott, and Michael Roberts placed 2nd in the NASA Aeronautics Amphibious Tiltrotor for Civilian Operations Competition.

- Former Space Academy Intern Kyle Yawn is currently working at the Lunar and Planetary Science Academy, exploring how to remove lunar dust from space suits. He has also worked on two pieces of hardware which are on board the International Space Station, trained space station astronauts, and developed technology to make rocket fuel on Mars. While Kyle goes where his curiosity

takes him, he encourages students to "keep coming up with questions to ask," because there are still many more problems to solve. Kyle has been responding to questions from high school students working on hands-on rocketry projects. Kyle says he feels like he is on the opposite side of the process now, and he is excited to see what these students can accomplish with a little guidance from him.

Outcome 2

Student Opportunities

- The Georgia Tech University Student Launch Team place 4th in the annual competition sponsored by the GSGC.

- The Black Graduate Student annual technical conference was funded by the GSGC. This program provided students with an opportunity to present technical papers and posters; network with industry and government professionals; and provide opportunities for further collaborations and internships.

Outcome 3

General Public

- Yuri's Night activities at the Fernbank Science Center in Decatur, Georgia were co-sponsored by the GSGC. This was a first time event, with collaboration with industry, government, non-profits, and higher education institutions. The activity will continue on an annually based on first year success.

- The Museum of Aviation in Warner Robins, Georgia, was able to increase its general public outreach programs with new support from the GSGC. The Museum of Aviation has been the preeminent museum in Georgia for aerospace and space related activities.

- Computers for the Future is a joint effort between La Unidad Latina, Lambda Upsilon Lambda, a Hispanic fraternity and the Atlanta School System. Undergraduate and graduate students worked with teachers and student to design futuristic computers.

PROGRAM ACCOMPLISHMENTS

Outcome 1

Title: Fellows Applied Leadership Program
GSGC MEMBER: Dr. Army Lester, Kennesaw State University

Description: Leadership program to help Kennesaw Space Grant Fellows develop skills for success in STEM.
Metric: 15 Fellows complete the 10 week program
Results: Achieved

Title: Space Shuttle Symposium
GSGC MEMBER: Georgia Tech
Description: The symposium was dedicated to honoring the contributions of men and women from the U.S. and around the world who dedicated their careers to the success of space missions in the Shuttle Era. Administrator Bolden was the Chair of the event and astronauts and NASA employees (past and present) were part of the agenda. The GSGC provided support by recruiting students through the Space Grant network and providing registration costs.
Metric: Registration for students from Space Grant Institutions
Result: 39 students were funded by the GSGC.

Title: Georgia State University Fellows
GSGC MEMBER: Dr. Doug Gies, Georgia State University
Description: GSGC funds support Ph.D. students in Astronomy and Physics
Metric: 2-3 students funded
Results: Achieved

Title: Externships
GSGC MEMBER: All GSGC affiliates
Description: Externships are an effective alternative to more costly and more time intensive internships, but with equal impact. The Externship Program is limited to STEM companies in the State of Georgia.
Metric: Preparation and development of full scale program. For the first year the metric is 5-9 undergraduate students.
Results: Program is still in development and metrics for first year have not yet been achieved.

Title: Georgia Astronomer's Meeting
GSGC MEMBER: Georgia Tech
Description: The annual meeting of the Georgia Regional Astronomers (GRAM) was held this past November and included professionals from industry and academia, along with students and general public. This year's event was hosted by new partner Agnes Scott College which is a 100% female institution.
Metric: 85 participants in the November conference
Results: Achieved metrics.

Title: NASA Space Academies and Internships
GSGC MEMBER: Georgia Tech

Description: Internship opportunities for undergraduate and graduate students at NASA field Centers.
Metric: 4-6 students funded to attend Academies/NASA internships
Results: 5 students funded (Johnson, Langley, Marshall, Goddard, and JPL).

Title: Industry Aerospace Internships
GSGC MEMBER: SpaceWorks Enterprises, Inc.
Description: Summer internship experiences related to spaceflight. SpaceWorks Engineering, Inc. (SEI) is an aerospace engineering concept design and systems analysis focusing on next-generation space transportation systems, future technologies, human and robotic exploration of space, and emerging space markets and applications for government and commercial clients.
Metric: 4 students successfully complete industry internship annually
Results: 4 students completed internship

Title: Mars Desert Research Stations (MDRS)
GSGC MEMBER: Georgia Tech
Description: This is an annual program which the GSGC has co-sponsored for the past 10 years. The Mars Desert Research Station (MDRS) is one of four simulated Mars habitats in the world, built and managed by the Mars Society.
Metric: A team consisting of 8-15 members travels to the research station to study and conduct research
Results: 12 students successfully participated.

Title: Space Grant Fellows
GSGC Member: All GSGC members
Description: Qualified undergraduate and graduate students pursuing STEM are eligible for scholarship/fellowship funding
Metric: 20 students
Results: Funding of students in progress. Results will exceed metrics in the total number of overall students, as well as the total number of female students and students from underrepresented groups.

Title: Space Weather Modeling Weekend (SWMW) Workshop (in conjunction with Dr. Ramone Lopez, UT-Arlington)
GSGC Member: Morehouse College

The SWMW Workshop is a 2-day event exposing Morehouse undergraduate majors in STEM fields to research opportunities in space weather research. Students learn and simulate a series of modeling techniques used by NASA scientists to predict space weather patterns and its effects on space shuttles and satellites. Students majoring in STEM disciplines from Morehouse, Spelman, and CAU are selected to participate. A brief informational session on graduate school and summer research internships in NASA-related fields is presented.
Metric: 12 students

Results: 12 students and 3 faculty members participated in all aspects of the program.

Outcome 2

Title: Universities Student Launch Initiative
GSGC MEMBER: Georgia Tech
Description: The GSGC has supported the USLI endeavor in the past and are working with students to develop a payload for the upcoming launch. The project engages students in scientific research and real-world engineering processes with NASA engineers.
Metric: Developing a new team and submitting a proposal for acceptance
Results: Students successfully completed rocket and place 4th in overall competition.

Title: Student Autonomous Unmanned Vehicle Competition
GSGC MEMBER: Dr. Anthony Choi, Mercer University
Description: Five students will participate in a student Autonomous Unmanned Vehicle Competition.
Metric : 5 students participated in completion.
Results: Achieved

Title: Robotics Workshop for Middle and High School Teachers
GSGC MEMBER: Dr. Anthony Choi, Mercer University
Description: This workshop is co-sponsored by Boeing for the 2nd year. Teachers design robots as part of in-service workshops that are designed so that teachers can train students in their classrooms during the school year.
Metric: 20 teachers participate in workshops
Results: Exceeded

Title: Professional Development for Teachers
GSGC MEMBER: Orbit Education
Description: In service programs for Georgia Teachers using NASA content and adhered to Georgia Standards for STEM.
Metric: 10 workshops and 35 teachers per session
Results: 250 teachers completed workshops to date. Program still in progress.

Title: Georgia STEM Day
GSGC MEMBER: Orbit Education
Description: Opportunity for teachers who have attended Professional Development to network, share progress, and enroll in new courses.
Metric: 100 -200 teachers attend
Results: Exceeded metrics. 215 teachers attended.

Title: Fort Valley Cooperative Development Program

GSGC Member: Fort Valley State University
Ninth-grade academy**.** The 9th-grade academy is an annual program held during the third and fourth weeks in the summer. The two-week academy exposes students to instruction in STEM by teachers who infuse each lesson with NASA content. In mathematics, the students study algebra and geometry; in engineering, each student works on a hands on project to teach them real world applications; and in the geology class, the students focus on the geological formation of Stone Mountain (Atlanta, GA) and study the geologic features of this massive granite rock and relate it to planets in the solar system. The final week culminates with a tour of space related research and hands on activities at Georgia Tech.
Metric: 24 students attend MSEA program
Results: 24 students attended the 2 week program

Title: NASA Fellows Pre-college Outreach
GSGC MEMBER: Dr. Army Lester, Kennesaw State University
Description: Space Grant Fellows are provided opportunities to teach pre-college students. Fellows work with students to make STEM more understandable and meaningful. The program has several components including visits to the K-12 schools; college visits for pre-college students; mentoring; tutoring; and field trips.
Metric: 16 high school students and 8 college students participate in program. 100% of the students were from underrepresented groups.
Results: Achieved

Title: Albany State University Lego Program
GSGC MEMBER: Dr. Atin Sinha, Albany State University
Description: One Day Workshop in ASU Engineering Laboratory performing projects with LEGO Next programmable robots, CNC lathe, SolidWorks CAD programming and understanding principles of flight in a subsonic wind tunnel
Metric: 12 students from underrepresented groups participate
Results: In progress

Title: Annual Bridge Building Competition
GSGC MEMBER: Dr. Atin Sinha, Albany State University
Description: Bridge Building Competition for high school students to design and develop bridge with strict constraints.
Metric: 65 students participated
Results: Achieved

Title: The MaNS Science Summer Program (MaNS = Materials, Nuclear, & Space) for rising 9th and 10th graders

GSGC Member: Morehouse College
The MaNS Science Summer Program is a 4-week, commuting, summer experience for 6-10 local high school students to be exposed to hands-on experiences in the STEM fields of materials science, nuclear science, and space science. The students: (1) conduct hands-on instructional modules, (2) initiate science projects to be continued in their respective high schools, (3) strengthen and advance their math, writing, and science skills by attending college courses at Morehouse, (4) interact with current undergraduate students in physics and engineering at Morehouse and Spelman College, and (5) participate in enrichment tours of local and regional MaNS laboratories and facilities to interact with professional scientists and engineers.
Metric: 6-10 high school students participate in and complete program
Results: 9 students successfully completed the program.

Title: Science, Engineering and Mathematics (SEM) Career Fair
GSGC MEMBER: Georgia Tech
Description: The GSGC provided support for an annual SEM Career Fair for high school students interested in pursuing STEM in college. The fair targeted students from underrepresented groups. Companies in attendance included Lockheed Martin, the CIA, Delta Airlines, and Scientific Atlanta.
Metric: Targeted – 200 students
Result: 127 students, 19 parents and/or administrators

Outcome 3

Title: Performance Learning Center
GSGC MEMBER: Mrs. Jacquelyn Whitt and Dr. Army Lester, Kennesaw State University
Description: The Performance Learning Center is a program for at-risk youth. The Learning Center chooses 15 students to participate in a STEM Academy at Kennesaw State University.
Metric: 15 students attend and complete Academy
Results: Achieved. Fifteen students attended and completed.

Title: Georgia STEM Agenda
GSGC MEMBER: Georgia Tech
Description: The STEM Agenda will bring together all non-traditional STEM stakeholders in the State to develop a collaborative network that will strengthen and improve outreach in the State. This program was an outcome of the Georgia team that collaborated on the first Summer of Innovation proposal.
Metric: Development of network and scheduling of webinars

Results: Ongoing development. A database of 32 organizations has been developed. Applications materials are available on-line, and related material has been developed. Speakers have been confirmed for upcoming webinars.

Title: Physics Demo Night and NASA Nights
GSGC MEMBER: University of West Georgia
Description: Community event for ages 6 and up to engage and inspire in STEM.
Metric: 100-300 participants
Results: 275 participants

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Diversity:
  The GSGC has 5 minority serving affiliate institutions, and partnered with Agnes Scott College, which is 100% female.

  All GSGC programs target the diversity of the State which is 39.6% underrepresented groups and 57% female.

- Minority-Serving Institutions:
  Clark Atlanta University, Spelman College (100% female), Morehouse College, Savannah State University, and Fort Valley State University. Specific programs are listed under program accomplishments.

- NASA Education Priorities:

  The GSGC programs engages middle school teachers throughout the State in curriculum enhancement activities. In particular, Affiliate member Orbit Education works with Kennedy Education to infuse NASA content into activities. Annually, Orbit Education reaches over 1,000 middle school teachers. Other affiliates are also actively engaged in working with middle school teachers. The Museum of Aviation, as a partner, provide additional opportunities to engage with middle school teachers through intensive, NASA infused in-service workshops.

  Funding of undergraduate and graduate students to attend NASA Space Academies; participate in USLI and other NASA related experiences; attend technical conferences; and work in internships that allow for real life problem solving are an integral part of GSGC programs. The proposal submitted in 2010 and subsequent progress reports demonstrate the GSGC commitment to students who will be entering the workforce in STEM fields.

IMPROVEMENTS MADE IN THE PAST YEAR

The GSGC meetings are in their second year of rotation, so that all affiliates can host and have an opportunity to showcase their programs. The most recent meeting was held on April 27, 2012, Fort Valley State University.

The GSGC expanded the fellowship programs by offering Georgia Space Grant Consortium Dean's Fellows in the Georgia Tech College of Engineering and the College of Science.

Policies and procedures developed in 2009 are ongoing, which include ensuring the accuracy and timelessness of reporting; and assuring that programs adhere to the 2010-2014 GSGC Strategic Plan and improvement plan

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

Consortium Structure/Network
The GSGC consists of 18 affiliate institutions listed below by geographic regions and with characteristic information listed. Two other non-affiliate partners joined in consortium activities this past fiscal year, including the Museum of Aviation (non-profit) in Warner Robins, Georgia; and Agnes Scott College (4 year college with 100% female institution) in Decatur, Georgia.

Atlanta Metropolitan Area

- Clark Atlanta University (HBCU, undergrad and graduate programs, co-director is a former Space Grant Fellow, focus area is collaborative engineering research with majority institutions that lead to NASA careers)
- Georgia Institute of Technology (Lead institution, undergraduate and graduate, focus areas - funding students for advanced degrees in STEM, collaborative research with HBCUs, providing workforce development opportunities for students)
- Georgia State University (undergraduate and graduate, focus area - funding students for Ph.D.s in Astronomy)
- Kennesaw State College (undergraduate and graduate, focus areas - providing scholarships and funding undergrad students to work in STEM outreach programs with K-12 students, and mentoring programs for students in STEM)
- Morehouse College (HBCU, all male, undergraduate only, co-director is a former Space Grant Fellow, focus areas - workforce development, research opportunities for students, and collaborations with other institutions)

- Orbit Education (nonprofit, focus areas - in -service and pre-service teacher training using NASA content materials)
- SpaceWorks Engineering, Inc. (Industrial Affiliate, provides internship opportunities)
- Spelman College (HBCU, all female, undergrad, acting co-director is a former Space Grant Fellow, focus areas – encouraging females students to pursue STEM, hands-on research opportunities and workforce development)

Central Georgia

- Mercer University (undergrad and graduate programs, focus areas – undergraduate research)
- Fort Valley State University (HBCU, Land Grant, focus area – enrichment programs for Pre-college and undergraduates that encourage them to pursue STEM fields for employment or for advanced degrees)

Central West Georgia

- Columbus State University (undergrad, grad, focus on astronomy, space and earth sciences, working in conjunction with the Coca Cola Space Science Center)

North Georgia

- North Georgia College and State University (undergrad and grad, focus area is astronomy, and observatory programs)

East Georgia

- University of Georgia (largest institution, Land Grant, undergraduate and graduate programs, focus area is using NASA technology in agricultural applications, agricultural engineering, chemistry, geology)

Southeast Georgia

- Albany State University (HBCU, undergrad and graduate programs, focus areas – providing research opportunities for undergrads, participation in ballooning activities with other Space Grants, collaborating with other HBCUs and majority institutions, bridge building and other hands on programs for high school students)
- Armstrong Atlantic State University (undergrad, co-director is a former Space Grant Fellow, focus areas – undergraduate research, mentoring for Pre-college, workforce development for students, collaborative research)
- Savannah State University (HBCU, undergrad, co-director is a former Space Grant Fellow, focus area is providing research opportunities and scholarships for students as well as collaborative programs)
- Georgia Southern University (undergrad and grad, focus – informal education via the university operated observatory)

West Georgia

- University of West Georgia (undergrad and graduate programs, focus – undergrad research, planetarium shows for pre-college and informal educators)

The 18 consortium affiliates each have unique programs that are run by an Affiliate Co-Director, who is responsible for submitting proposals, accurate and timely reporting, and participation as needed in the decision making for GSGC. Affiliate Co-Directors are the representative/ambassadors of the GSGC on their campuses and are encouraged to publicize and promote consortium activities.

The GSGC Advisory Board is integral to the success of the Externship Program and has provided leadership support in the development of this innovation new initiative. The Board is equally important in recommending strategies and continually providing input for consortium success in this 5 year renewal period.